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PSYCHE

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ON SOME CENTRAL AND SOUTH AMERICAN PTEROSTICHINI (COLEOPTERA, CARABIDAE) IN THE MUSEUM OF COMPARATIVE ZOOLOGY*

BY S. L. STRANEO
Gallarate, Italy

Some weeks ago I received for study from Dr. P. J. Darlington Jr. many undetermined Central and South American Pterostichini from the collection of the Museum of Comparative Zoology of Cambridge, Massachusetts. This material was so interesting that I decided to write the present notes on it and on a few examples of two of the same species in my collection. I have to thank Dr. Darlington for submitting these specimens to me and for permission to keep many duplicates for my collection.

Tichonia orientalis, n. sp.

Purplish violaceous, metallic color stronger in the holotype ♂ than in the allotype ♀; lower surface blackish, legs dark rufopiceous, antennae and palpi wholly ferrugineous. Length 11.6 mm.; width 4.4 mm. Head robust; eyes prominent and convex; frontal impressions wide and deep, narrow and strongly divergent behind, reaching the 2nd supraorbital seta; antennae long and slender, exceeding by the last three segments the base of the pronotum. Prothorax transverse in the ♂ (2.5 by 3.3 mm.) and nearly square in the ♀; sides rather strongly rounded and narrowed to apex (2 mm.), straight or a little subsinuate towards base (2.8 mm.); anterior angles obtuse, rounded; basal angles nearly square, with apices slightly rounded; basal impressions, one on each

*Published with a grant from the Museum of Comparative Zoology at Harvard College.

side, deep, wide, more than one half the length of the prothorax; space between the basal impressions and the sides strongly sloping towards the impressions; lateral margin narrow, with the two usual setiferous punctures; base impunctate, unmargined, nearly straight; disc very depressed, with the median line deeply impressed, elongate, reaching the base, not reaching the anterior margin. Elytra oval (7.4 by 4.4 mm.), strongly convex; shoulders square, each with a distinct tooth; basal margin strong, nearly straight; striae deep, impunctate; interstices strongly convex, base of the second with an umbilicate pore, third without dorsal punctures, sixth and seventh a little raised near the shoulders; apical declivity rather strong. Underside wholly impunctate; prosternum with a moderate depression before the coxae; prosternal process not margined at the extremity; metepisterna very short; abdominal segments strongly sulcate across the base; anal segment with a single puncture on each side in the ♂ and two in the ♀. Aedeagus with apical blade peculiarly formed (Fig. 1). Anterior tarsi of ♂ moderately dilated.

Holotype ♂ from Hansa Humboldt, Sta. Catharina, Brazil, in my collection (from E. Reitter); allotype ♀ from Nova Teutonia (27° 11′-52° 23′), 3500 m., Brazil (F. Plaumann, 20-X-1948) (Museum of Comparative Zoology, Type No. 28,441).

This new species has, like *T. catharinae* Tschit., the base of the prothorax distinctly narrower than the base of the elytra, but the sides of the prothorax are slightly subsinuate toward the base and the size is much smaller (11.6 instead of 16 mm.).

Tichonia paraguayensis, n. sp.

Purplish violaceous on prothorax and elytra; head blackish; lower surface black, shiny, a little iridescent; legs blackish; antennae and palpi dark rufopiceous. Length 15.2 mm.; width 5.7 mm. Head robust and strongly sculptured; eyes wide and prominent; frontal grooves rather narrow, not elongate, reaching only the anterior supraorbital puncture; antennae rather robust, exceeding the base of

the prothorax by the two last segments. Prothorax moderately transverse (3.4 by 4.3 mm.), with sides strongly rounded and narrowed anteriorly (width of apex 2.3 mm.), only a little rounded and nearly straight towards base (4.1 mm.), which is wider than base of elytra; anterior angles obtuse, rounded; basal ones raised, nearly square, not dentate; basal impressions much longer than in any other species of the genus, reaching ¾ of the length of the prothorax, very deep; lateral margin narrow, with the two usual punctures; base impunctate, strongly depressed, as is the whole disc. Elytra oblong-oval (9 by 5.7 mm.), convex, with the sides slightly rounded behind the shoulders and widest near middle; shoulders square, dentate; striae deep, impunctate; interstices very convex, the sixth and seventh a little raised near shoulders. Prosternum with a moderate longitudinal groove; prosternal process not margined; metepisterna short; ventral segments strongly sulcate across base and with deep depressions at sides; anal segment with one fovea on each side in ♂ and two in ♀. Aedeagus with apical blade rounded, without apical spine.

Holotype ♂ and 2 ♂ ♂ paratypes from Rio Confuso, Paraguay (from Institut Fabre, through Prof. Porta), in my collection; allotype ♀ from Villarica, Paraguay (Museum of Comparative Zoology, Type No. 28,440).

This new species is colored like *T. superba* and *festiva* Tschit. but belongs to the group of *depressicollis* Dej., with the tip of the aedeagus simply rounded, without spine. It differs from every previously known species of the genus by the very long, strong basal impressions of the prothorax, which reach three fourths the length of the prothorax, while in the other species they do not exceed half the length.

Oxycrepis parvula, n. sp.

Black shining, with apex of elytra slightly brownish; antennae with segments 1-3 ferrugineous brown, 4-6 darker, 7-11 wholly white; ventral segments brownish, iridescent; anal segment ferrugineous. Length 5.6 mm.; width 2.2 mm. Head elongate; eyes wide, moderately convex, temples very short; frontal grooves deep, wide, short; antennae long.

Pronotum as in the other species of the genus, nearly as long as wide (1.3 by 1.4 mm.), with base (0.7 mm.) narrower than apex (0.8 mm.); latter with a strong, entire margin; base impunctate, with sides strongly oblique, so that the basal angles are obtuse; lateral margins very narrow; disc strongly convex, with median line deeply impressed from anterior margin nearly to base. Elytra subrectangular (3 by 2.2 mm.); shoulders widely rounded; striae deep, wide, and strongly punctate; interstices convex; striae 4-9 not reaching base of elytra. Underside impunctate; metepisterna elongate, strongly grooved inwardly; anal segment of ♂ with one setiferous puncture on each side.

Holotype ♂ from Rio Frio (S. of Santa Marta), Prov. of Magdalena, Colombia (Museum of Comparative Zoology, Type No. 28, 436); and allotype ♀ from Sevilla (near Rio Frio), August 28 (in my collection). Both specimens collected by P. J. Darlington Jr.

This new species is near *gracilis* Bts. but is less narrow, with apex of elytra darker, and with base of prothorax wholly impunctate.

Loxandrus minimus, n. sp.

Head and pronotum brown, more or less infuscate; elytra blackish brown with humeral margins, suture, and lateral margins ferrugineous; epistoma, legs, palpi, and first three antennal segments ferrugineous, the other segments darker. Length 4.2 mm.; width 1.8 mm. Head normal; eyes moderately convex; frontal grooves short and wide; antennae rather long. Prothorax transverse (1 by 1.4 mm.), slightly emarginate anteriorly, with an anterior submarginal line not interrupted at middle; sides moderately rounded, slightly subsinuate before base; anterior angles rounded, not or very little prominent; anterior margin a little narrower (0.95 mm.) than base (1.2 mm.); hind angles square, with their apices sharp and dentate; basal impressions rather deep, moderately elongate; spaces between them and lateral margins nearly flat; lateral margins rather narrow, each with the two usual punctures; base a little depressed, not

margined at sides, evidently punctate at middle; disc slightly convex, with median line rather deep but short. Elytra subrectangular (2.6 by 1.8 mm.); sides rounded just behind shoulders, thence parallel for ¾ of length; shoulders widely rounded; striae deep and well punctate; interstices moderately convex. Underside smooth; metepisterna twice as long as wide. Hind tarsi not carinate above; onychium glabrous beneath, nearly as long as the first segment. Aedeagus as figured (Fig. 2).

Holotype ♂ (Museum of Comparative Zoology, Type No. 28,438), allotype ♀ (in my collection), and one paratype (M.C.Z.) from Rio Frio (S. of Santa Marta), Prov. of Magdalena, Colombia; and 4 additional paratypes (M.C.Z. and my collection) from Aracataca (S. of Rio Frio). All specimens taken by P. J. Darlington.

L. minimus is the smallest species of the genus. The small size and the color distinguish it at once.

Sierrobius, n. gen.

Not winged; glabrous. Head with clypeus bisetose; two supraorbital setae each side; supraorbital ridges regular; labrum transverse, 6-setose; mandibles rather elongate, sharp, hooked at tip, the external scrobes without setae; mentum rather deeply incised, median tooth more or less prominent, excavated at apex, lightly incised in some species, truncate or rounded in others, lobes rounded at sides, apices of epilobes barely projecting as a short tooth on each side; ligula short, wide, apex bisetose; paraglossae narrow, membranous, with apical halves free; palpi with penultimate segments bisetose, the apical ones slightly attenuate and subtruncate at apex, apparently glabrous, but actually with a few very short, very thin setae; maxillae sharp, hooked at apex, inwardly fringed with bristles, outer lobe jointed; maxillary palpi with last segment fusiform; antennae rather short, pubescent from and including segment 4. Prothorax with a setigerous pore near each basal angle and 1-3 such pores on each side in different species, in anterior half. Elytra with a basal margin, 9-striate, with a variable short scutellar stria between striae 1 and 2 and a setiferous puncture near base of 2; interstice 3 with 2-4

punctures; inner plica present and well developed. Underside glabrous; prosternal process glabrous, margined at apex; metepisterna short, very little longer than wide; abdominal segments sulcate and with series of deep punctures across base. Legs normal except for the hind tibiae of one species; protarsi of male with first 3 segments strongly dilated, triangular; basal segments of tarsi glabrous on the upper side, not sulcate or carinate externally; segment 4 not emarginate; onychium with a few setae beneath; claws smooth. Aedeagus with the apical blade characteristically modified in the different species.

Genotype: *Sierrobius smaragdinus* Straneo (below)

Sierrobius could be considered a subgenus of the great genus *Pterostichus* (*sensu lato*), but the five new species I refer to it are very homogeneous generically, though very different from each other, and from other previously known species, and I prefer to consider it a distinct genus, confined to the Sierra Nevada de Santa Marta, Colombia.

Key to the Species of *Sierrobius*

1 (8) Size over 8 mm.; hind angles of prothorax more or less blunt.

2 (3) Striae of elytra strongly but irregulary impressed; lateral margin of pronotum in anterior half always with 2-3 setae; aedeagus as in Fig. 3 *smaragdinus* n. sp.

3 (2) Striae of elytra either strongly but regularly impressed, or faint; lateral margin of prothorax in anterior half usually with a single seta.

4 (7) Elytra with all striae faint throughout, except that 2 and 3 are lightly impressed in one species and 7 is always rather deeply impressed; basal angles of prothorax wholly rounded.

5 (6) Size smaller (12 mm.); striae 2 and 3 slightly but distinctly impressed; extremity of stria 7 deeply and irregularly impressed, with two conspicuous setiferous punctures; aedeagus with apex strongly asymmetrical (Fig. 4). . *bistriatus* n. sp.

6 (5) Size larger; all striae faint; aedeagus with apex nearly symmetrical (Fig. 5) ..... *laevigatus* n. sp.

7 (4) All striae deeply and regularly impressed; basal angles of prothorax obtuse but well formed. *uniformis* n. sp.

8 (1) Size 8 mm.; hind angles of prothorax square. *parvulus* n. sp.

Sierrobius smaragdinus, n. sp.

Head bright green; prothorax green with golden reflections; elytra green with bluish reflections chiefly at sides; mouth piceous black; femora brown with metallic reflections; underside slightly greenish; antennae brown; palpi blackish with apices ferrugineous. Length 12.8 mm.; width 4.1 mm. Head smooth and shining; eyes moderate, temples short and little convex; frontal impressions very short and very little impressed; antennae moderately elongate, hardly reaching base of prothorax, with segments 4-11 pubescent. Prothorax subquadrate (3.1 by 3.8 mm.), anteriorly a little emarginate, with sides very little rounded, nearly parallel at middle, briefly narrowed to apex (width 2.6 mm.) and base (width 3 mm.) ; anterior angles only a little prominent, rounded; basal ones a little obtuse, with their apices rounded; basal impressions foveiform, elongate, deep, and rather wide; spaces between them and lateral margins convex; side margins narrow, nearly linear, with two setigerous pores in anterior half (♂) or three (♀) and also the usual pore near each basal angle; base nearly impunctate, a little rugose at middle, slightly margined at sides; disc only a little convex; median line deep, abbreviated anteriorly and posteriorly. Elytra subparallel, convex (7.6 by 4.1 mm.) ; sides slightly rounded behind base; shoulders rounded, without teeth; basal margin strong, nearly right; scutellar stria very short, with a large puncture near base; striae very irregular, only slightly impressed, punctate; interstices only slightly convex, irregular, third with 4 large punctures, of which the first is near the third stria, the others near the second; seventh interstice with two apical punctures; umbilicate series of 16 punctures; apical sinuation strong.

Prosternum slightly depressed between coxae; pro-episterna smooth; metepisterna small, nearly as long as wide; prosternal process margined; abdominal segments sulcate and with series of coarse punctures across their bases; anal segment with one puncture each side (♂) or with two (♀). Microsculpture of elytra rather indistinct. Aedeagus as shown in Fig. 3.

Holotype ♂ (Museum of Comparative Zoology, Type No. 28,426) and allotype ♀ (my collection) from the northwestern Sierra Nevada de Santa Marta, Colombia, 12,000 ft., Feb. 11, 1929 (Darlington).[1] The specimens were taken in the *páramo* zone above the forest line.

Sierrobius bistriatus, n. sp.

Head and prothorax metallic dark blue; elytra greenish blue with slight metallic reflections; underside brown with metallic reflections; legs, antennae, and mouth ferrugineous brown. Length 11.2 mm.; width 3.7 mm. Head as in preceding species. Prothorax with sides more rounded, more narrowed posteriorly; only one seta on each side in anterior half of lateral margin. Elytra shaped as in the preceding species, but with the shoulders more rounded; striae very faint excepting the third and fourth ones, which are very lightly impressed; third interstice with three large punctures, of which the first is near the third stria, the others near the second. Underside as in *smaragdinus*. Hind tibiae simple. Aedeagus of wholly different shape (Fig. 4.)

Holotype ♂ (Museum of Comparative Zoology, Type No. 28,428) from the northwestern Sierra Nevada de Santa Marta, Colombia, 8-11,000 ft., Feb. 10-12, 1929 (Darlington). The type is unique. It comes from the highest ("temperate") moutain forest.

Sierrobius laevigatus, n. sp.

Upper surface metallic violaceous red with greenish reflections, lightly alutaceous, moderately shining; underside blackish; appendages brownish piceous. Length 16 mm.;

[1] All specimens taken in the Sierra Nevada de Santa Marta by P. J. Darlington Jr. were collected along the trail that ascends the Sierra from Rio Frio.

width 5.1 mm. Head stouter than in the preceding species, with shorter mandibles and less convex eyes. Prothorax of nearly the same shape as in *bistriatus* but more elongate (4 by 4.5 mm.), with a single seta on each side in the anterior half of the lateral margin as well as the usual one at each basal angle. Elytra smooth, striae all faint, not impressed (but ninth stria well impressed as usual); three punctures on each side in the third interstice; umbilicate series of 15 punctures. Underside as in the other species. Hind tibia with a stout tooth ventrally (Fig. 6). Elytral microsculpture very regular, isodiametric. Aedeagus with apex rather regular (Fig. 5).

Holotype ♂ (Museum of Comparative Zoology, Type No. 28,425) from the northwestern Sierra Nevada de Santa Marta, Colombia, 4-8,000 ft., July 20, 1928 (Darlington). The type is unique. It was found on the ground in heavy "subtropical zone" forest.

Sierrobius uniformis, n. sp.

Brown; head, prothorax, and elytra without metallic reflections; scarcely shining, elytra alutaceous. Length 14 mm.; width 4.7 mm. Head as in preceding species, but with frontal impressions wide and deep, though short. Prothorax transverse (3 by 4.1 mm.), with sides regularly and equally narrowed and rounded anteriorly and posteriorly; anterior margin distinctly emarginate; anterior angles little prominent, obtuse, well rounded; basal angles obtuse, with their apices scarcely blunted; basal impressions deep, rather elongate; spaces between them and lateral margins slightly impressed near base, as if there were poorly marked external basal impressions; basal margin vestigial, visible only at sides; lateral margin narrow, with a single puncture on each side in anterior half and the usual puncture at each basal angle; disc moderately convex, with median line rather deep, almost reaching base. Elytra convex, subparallel (8.1 by 4.7 mm.); scutellar stria distinct, without basal pore; striae well impressed, regular; interstices rather convex, third with three or four dorsal punctures. Underside as in the other species of the genus; anal segment of ♀ with two

punctures on each side. Hind tibiae normal. Male unknown.

Holotype ♀ (Museum of Comparative Zoology, Type No. 28,427) from the northwestern Sierra Nevada de Santa Carta, Colombia, 12,000 ft., Feb. 11, 1929 (Darlington). The type is unique, and is from the *páramo* zone.

Sierrobius parvulus, n. sp.

Upper surface dark bronze; head and prothorax shining, elytra (♀) alutaceous; antennae, legs, and palpi ferrugineous; underside brown. Length 7.9 mm.; width 2.7 mm. Head robust; eyes small and little convex; temples half as long as the eyes; frontal impressions deep, parallel, moderately elongate. Prothorax elongate, subrectangular (2 by 2.2 mm.), truncate anteriorly; sides moderately rounded and narrowed anteriorly, nearly straight and slightly convergent towards base; anterior angles not or very little prominent, rounded; posterior angles square, with their apices not rounded; basal impressions slightly impressed, spaces between them and lateral margins little convex; lateral margins narrow, with one puncture on each side in anterior half and the usual puncture at each posterior angle; base not margined at sides; disc only a little convex; median line nearly reaching base. Elytra oblong-ovate (4.3 by 2.7 mm.); shoulders slightly obtuse, each with a minute tooth; scutellar stria very short, without apical pore; striae moderate; interstices not convex, the third with two punctures of which the first is at 1/5 and the other at 3/5 of the length; apical sinuation slight. Underside as in the other species of the genus. Hind tibiae simple. Male unknown.

Holotype ♀ (Museum of Comparative Zoology, Type No. 28,429) from the northwestern Sierra Nevada de Santa Marta, Colombia, 8-11,000 ft., Feb. 10-12, 1929 (Darlington). The type is unique, and is from the "temperate" forest zone.

Pachyabaris, n. gen

So closely allied to *Abaris* Dej., *Abaridius* Chaud., and *Pseudabaris* Chaud. that it is not necessary to give a full description. The peculiar characters of the new genus are;

shape of prothorax, differing from species to species; *third interstice of elytra with at least three conspicuous foveae;* ventral segments deeply grooved and with series of large punctures across their bases; tarsal claws not pectinate; onychium with setae beneath. This genus is most closely allied to *Pseudabaris,* which too has the ventral segments grooved and the tarsal claws not pectinate, but the new genus differs from *Pseudabaris* in having the third interstice of the elytra tri- or quadri-foveolate.

Key to the Species of *Pachyabaris*

1 (4) Sides of prothorax strongly rounded and narrowed anteriorly and posteriorly.

2 (3) Prothorax strongly transverse, with anterior margin rather deeply emarginate, and with sides rounded to basal angles; shoulders squarer. *darlingtoni* n. sp.

3 (2) Prothorax less transverse, with anterior margin less emarginate, and with sides evidently subsinuate before base, so that the basal angles are less obtuse . . . . . *subcordata* n. sp.

4 (1) Sides of prothorax not much rounded, nearly straight and parallel.

5 (6) Striae rather strongly impressed, regular. *striolata* n. sp.

6 (5) Striae slightly impressed or irregular; interstices nearly flat.

7 (8) Prothorax widest before middle, its sides nearly straight, slightly narrowed towards base, with hind angles nearly square; all dorsal elytral punctures near 3rd stria; size smaller (6 mm.). *minuta* n. sp.

8 (7) Prothorax widest behind middle, its sides slightly but distinctly rounded towards base, with hind angles obtuse; only anterior dorsal elytral puncture near 3rd stria;size large (7.5 mm.). *laevis* n. sp.

Pachyabaris darlingtoni, n. sp.

Dark bronze, scarcely shining; underside brown; legs, antennae, and palpi ferrugineous brown. Length 8.6 mm.; width 3.3 mm. Head moderately elongate; eyes wide, moderately convex; frontal impressions very short and deep; antennae scarcely exceeding base of prothorax, with segments 4-11 pubescent. Prothorax transverse (2.1 by 2.9 mm.); sides strongly and regularly rounded; anterior angles obtuse, prominent; anterior margin distinctly emarginate; hind angles very obtuse, rounded at tips (the hind angles are not rounded in the paratype); anterior width 1.7 mm.; basal width 2.3 mm.; one basal impression each side, deep; spaces between the impressions and the lateral margins each with a slight depression reaching lateral margin near middle of length; lateral margins narrow, each with the two usual setae; base impunctate, depressed between basal impressions, straight; disc only a little convex, with median line short, moderate. Elytra oblong-ovate (4.7 by 3.3 mm.); shoulders square; basal margin moderately incurved towards shoulders; scutellar stria rather long; striae deep, impunctate; interstices slightly convex; third interstice with four deep, distinct foveae, the first at basal ¼ near third stria, the others near second stria (the number of foveae varies from 3 to 4); apical sinuation very strong. Prosternum not sulcate, sometimes slightly depressed; prosternal process margined; metepisterna not longer than wide, sulcate along anterior and interior sides; abdominal segments transversely sulcate, with series of strong punctures in the sulci; anal with one (♂) or two (♀) setae each side. Hind tarsi with only first segment slightly sulcate externally. Aedeagus as in Fig. 7.

Holotype ♂ (Museum of Comparative Zoology, Type No. 28,433), allotype ♀ (my collection), and one ♀ paratype (M.C.Z.) all from the northwestern Sierra Nevada de Santa Marta, Colombia, 12,000 ft., Feb. 11, 1929 (Darlington), taken of course in the *páramo* zone.

Pachyabaris subcordata, n. sp.

Color as in *P. darlingtoni.* Length 11.3 mm.; width 3.9 mm. Head as in *darlingtoni.* Prothorax same in shape but with sides briefly but distinctly subsinuate before base; length of prothorax 2.5, width 3.3, width of apex 2.5, width of base 2.5 mm. Elytra with shoulders more rounded; basal margin very thick, straight, not incurved; striae deeper and with indistinct vestigial punctation; scutellar stria shorter. Male unknown.

Holotype ♀ (Museum of Comparative Zoology, Type No. 28,435) from northwestern Sierra Nevada de Santa Marta, Colombia, 12,000 ft., Feb. 11, 1929 (Darlington). The type is unique.

Pachyabaris striolata, n. sp.

Upper surface bronze, moderately shining; underside brown, with slight bronze reflections; antennae, palpi, and legs ferrugineous red. Length 7.7 mm.; width 2.5 mm. Head as in *P. darlingtoni.* Prothorax rectangular (1.9 by 2.2 mm.); sides slightly narrowed anteriorly, nearly parallel or very slightly narrowed towards base; anterior width 1.5, basal width 2 mm.; basal angles square, with tips not rounded; basal impressions narrow, rather deep; spaces between them and lateral margins moderately convex; lateral margins narrow, linear, each with the two usual pores; base nearly impunctate, not depressed between the impressions; disc little convex, with the median line moderately deep, reaching base. Elytra elongate (4.1 by 2.5 mm.); shoulders square, each with a minute tooth; basal margin straight, not thick; striae moderately impressed; interstices nearly flat, third with a puncture at basal ¼ near third stria and two more punctures behind middle near second stria; apical sinuation moderate. Underside as in the other species; metepisterna with a few indistinct punctures. Microsculpture of elytra not very distinct. Aedeagus as shown in Fig. 8.

Holotype ♂ (Museum of Comparative Zoology, Type No. 28,430), allotype ♀ (coll. Straneo), and one ♀ paratype

(M.C.Z.) all from the northwestern Sierra Nevada de Santa Marta, Colombia, 12,000 ft., Feb. 11, 1929 (Darlington), from the *páramo* zone.

Pachyabaris minuta, n. sp.

Upper surface rather dark bronze; antennae, legs, and palpi darker than in the other species of the genus. Length 6.1 mm.; width 2.3 mm. Prothorax subrectangular, shaped as in *striolata* (1.4 by 2 mm.); basal width 1.7, apical width 1.3 mm. Elytra oblong (3.4 by 2.3 mm.); shoulders each with a minute tooth; basal margin slightly sinuate, not thick; striae lightly impressed, with vestigial punctation; interstices almost flat, third with 3 or 4 large punctures, all near third stria; apical sinuation slight. Hind tarsi stouter than in any other species of the genus. Microsculpture of elytra and of base of prothorax distinct, isodiametric. Aedeagus as shown in Fig. 9.

Holotype ♂ (Museum of Comparative Zoology, Type No. 28,434), allotype ♀ (coll. Straneo), and two paratypes (♀ in M.C.Z., ♂ in coll. Straneo) all from the south side of the Sierra Nevada de Santa Marta, Colombia, 8-11,000 ft. (T. D. Cabot).

Pachyabaris laevis, n. sp.

Upper surface as in preceding species; legs, antennae, and palpi reddish brown. Length 7.6 mm.; width 2.9 mm. Form stouter than in preceding species. Prothorax wide (2.1 by 2.7 mm.); sides moderately narrowed anteriorly, very little so basally; anterior width 1.7, basal width 2.5 mm.; basal angles obtuse, with tips moderately rounded; basal impressions faint, spaces between them and lateral margins convex; base narrowly margined at sides; disc little convex, with median line moderately impressed, subpunctate, not reaching base. Elytra convex, moderately elongate (4.1 by 2.9 mm.); shoulders nearly square, each with a minute tooth; scutellar stria variable; striae faint; interstices flat, third with 3 or 4 punctures, the anterior one near third stria,

others usually near second stria. Underside as in the other species of the genus. Microsculpture of elytra fine, isodiametric. Hind tarsi more slender than in *minuta*. Aedeagus as shown in Fig. 10.

Holotype ♂ (Museum of Comparative Zoology, Type No. 28,431), allotype ♀ (coll. Straneo), and 8 paratypes (M.C.Z. and coll. Straneo) all from northwestern Sierra Nevada de Santa Marta, Colombia, 11-12000 ft., July 21, 1928 (Darlington), taken in the *páramo* zone.

Pseudabaris montanus, n. sp.

As the species of this genus are very closely allied among themselves and not well characterized, I give only a short preliminary description of this new one. Color aeneous, a little greenish, elytra slightly cupreous; underside dark brown; legs reddish brown; antennae wholly ferrugineous. Length 6.6 mm.; width 2.7 mm. Prothorax with sides regularly rounded, only a little narrower at base than anteriorly; base wholly impunctate, with the inner basal impression rather slightly impressed and the outer one very short, nearly evanescent; spaces between basal impressions and lateral margins not depressed. Elytra short and convex, rather strongly dilated behind shoulders, which are minutely dentate; scutellar stria rather long. Apex of aedeagus shown in Fig. 11.

Holotype ♂ (Museum of Comparative Zoology, Type No. 28,432) and allotype ♀ (coll. Straneo) from Rio Frio, south of Santa Marta at the foot of the Sierra Nevada, Colombia, May 15, 1928 (Darlington); and 4 paratypes from northwestern foothills of the Sierra Nevada de Santa Marta, Colombia, not above 3,000 ft., May 22, June 2, and June 17, 1928 (Darlington).

This new species differs from *columbicus* Chaud. by smaller size; prothorax narrowed toward base; and elytra shorter, more rounded behind shoulders.

Marsyas minutus, n. sp.

Whole upper surface more or less greenish or coppery bronze; underside and legs blackish brown; antennae, tarsi,

and palpi ferrugineous. Length 10 mm.; width 3.4 mm. Head robust, with neck a little constricted; eyes wide, moderately convex; frontal sulci narrow and elongate; antennae slender, reaching the base of the prothorax. Prothorax moderately elongate (2.4 by 2.8 mm.); sides regularly rounded; anterior angles near neck, rounded; basal angles nearly square, their tips moderately rounded; basal sulci narrow and moderately elongate; disc smooth, little convex; median line little impressed anteriorly, deep between the basal sulci, nearly obsolete near base; base impunctate, margined at sides; lateral margins very narrow, linear. Elytra oblong, elongate (5.6 by 3.4 mm.); sides little narrowed towards shoulders; latter rounded, not dentate; striae deep, lightly punctate; interstices convex; third interstice with three punctures, the first at basal ¼ near third stria, the others near second stria. Underside smooth, impunctate; metepisterna 1.5 times long as wide, sulcate along inner and anterior sides. Legs normal; onychium with fine setae beneath. Aedeagus as shown in Fig. 12.

Holotype ♂ (Museum of Comparative Zoology, Type No. 28,439), allotype ♀ (coll. Straneo), and 14 paratypes (M. C.Z. and coll. Straneo) all from vicinity of Horqueta, Paraguay, January 21 and 27 and February 1 and 4, 1934 (A. Schulze).

This new species, because of the position of the dorsal punctures of the elytra, belongs in the group of *M. viridiaeneus*. It differs from *M. bahiae* Tschit. by the shape of the prothorax, which is considerably narrowed towards base, and by the color of the upper side.

Genus *Cynthidia* Chaud.

Five species belonging to this genus have been described. There are probably several undescribed species, but I can give only a preliminary description of one of them. I have not yet secured males of *planodisca* Perty and *cancellata* Brullé necessary for comparison with the other new ones.

Key to the Species of *Cynthidia*

1 (8) Third interstice of elytra with 2 or 3 impressed punctures.

2 (5) Frontal furrows deep and irregularly wide, the space between them carinate at middle.

3 (4) Prothorax with two basal impressions of subequal depth on each side; aedeagus as figured (Fig. 13) ..... *crocipes* Perty

4 (3) Prothorax with only the inner basal foveae (spaces between latter and lateral margins flat or very slightly impressed); aedeagus as figured (Fig. 14) ..... *majorina* n. sp.

5 (2) Frontal furrows only moderately deep, not irregularly wide, the space between them regularly convex but not carinate at middle.

6 (7) Interstices of elytra flat; dorsal pores on third interstice more distinct; elytra more or less opaque; prothorax shorter; frontal sulci wider *planodisca* Perty

7 (6) Interstices of elytra subconvex; dorsal pores on third interstice less distinct; elytra not opaque; prothorax longer; frontal sulci narrower *cancellata* Brullé

8 (1) Third interstice of elytra with wide foveae.

9 (10) Elytra damasked ..... *octocoela* Chaud.

10 (9) Elytra not damasked ..... *foveata* Chaud.

Cynthidia majorina, n. sp.

Very near *C. crocipes.* The new species differs from the latter as follows: head with a light, minute, oval fovea near middle of front, between frontal sulci; prothorax less narrowed anteriorly, without distinct external basal impressions; elytra with dorsal punctures more conspicuous. Length 11 mm. Aedeagus with different apex (Fig. 13).

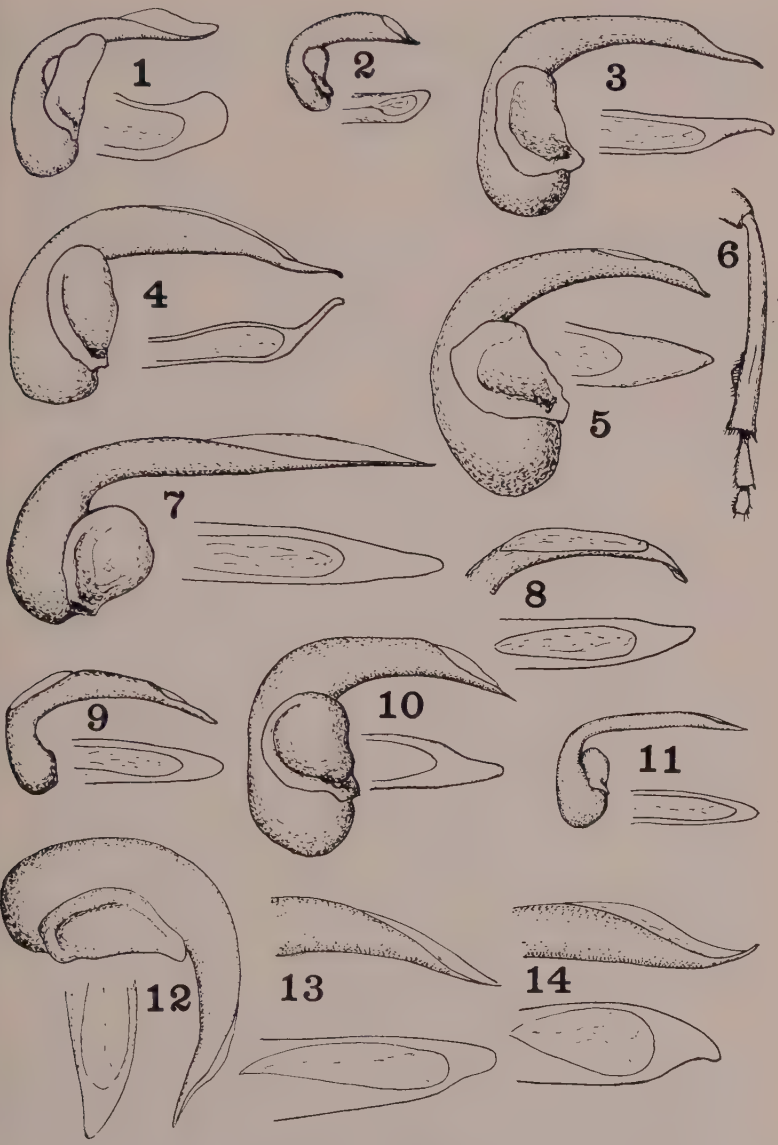
Holotype ♂ (Museum of Comparative Zoology, Type No. 28,424) and allotype ♀ (coll. Straneo) from Mafra, Sta.

Catharina, Brazil, 780 m. (A. Maller); one ♂ paratype from 5 km. south of Sta. Maria, Rio Grande do Sul, Brazil (Th. White); and one ♂ from Villarica, Paraguay (F. Schade). A dark ♀ example from S. Bernardino (Paraguay) probably belongs to this species.

The specimens I have attributed to *C. crocipes* are from Paranà (♀, in my collection); Villarica, Paraguay (5 specimens in M.C.Z.); and S. Antonio (Paraguay) (3 specimens from Institut Fabre, through Prof. Porta, in my collection).

EXPLANATION OF PLATE 1

1. Aedeagus of *Tichonia orientalis* n. sp. 2. Aedeagus of *Loxandrus minimus* n. sp. 3. Aedeagus of *Sierrobius smaragdinus* n. gen. et sp. 4. Aedeagus of *Sierrobius bistriatus* n. sp. 5. Aedeagus of *Sierrobius laevigatus* n. sp. 6. Hind tibia of *Sierrobius laevigatus* n. sp. 7. Aedeagus of *Pachyabaris darlingtoni* n. gen. et sp. 8. Aedeagus of *Pachyabaris striolata* n. sp. 9. Aedeagus of *Pachyabaris minuta* n. sp. 10. Aedeagus of *Pachyabaris laevis* n. sp. 11. Aedeagus of *Pseudabaris montanus* n. sp. 12. Aedeagus of *Marsyas minutus* n. sp. 13. Aedeagus of *Cynthidia crocipes* Perty. 14. Aedeagus of *Cynthidia majorina* n. sp.



STRANEO — PTEROSTICHINI

NOTES ON SOME NEW ENGLAND PHRYGANEIDAE (TRICHOPTERA)[1]

By Nathan Banks
Holliston, Mass.

Among the caddice flies taken by Prof. Brues at Petersham, Mass., and also by the State Forest Service in Maine, there are many specimens of *Banksiola.* More than half are *selina,* but many are *dossuaria,* and there are (from Petersham) six specimens of *smithi* (both sexes) and two males and two females of *cava,* previously known to me by only one specimen. Also from various localities there are many *canadensis* and some of the similar (in appearance) *Neuronia angustipennis.*

In *B. selina* I note that there is much variation in the processes on the hind margin of the genital cavity, and frequently the two sides are unlike.

Of the *dossuaria* six are from Petersham, the others from Maine; Tim Pond, Holeb, Ashland, Hardwood Mt., Oquossoc, Camp Colby, Round Mt., Seeboomook.

The *smithi* are all from Petersham, except one from Holliston. Leonard has recorded *B. smithi* from Michigan. The *canadensis* are mostly from Ashland and Gibson, one Tramway, Jonesboro, and Kellyland. (These are the ones pinned, others were put in alcohol, and many more discarded, mostly *selina.*)

In the M.C.Z. collection there is a new species of *Banksiola* from eastern Massachusetts, noticeable for its four subequal horns.

Banksiola cornuta, n. sp.
Figures 3, 4, 12, 15, 19

The tip of the abdomen shows four large spines, the upper pair with a double tip, inner edge a little irregular, the lower

[1] Published with a grant from the Museum of Comparative Zoology at Harvard College.

pair of horns simple, and no teeth along the hind margin of the last abdominal segment. From the side one sees the long upper tooth and the lower, and between is an upward extension of lower part, terminating in a rounded tip, just below the upper horn; this tip is provided with numerous long bristles.

From behind one sees the lower tooth of each side, and between, the inner membrane with a large deep excision, much longer than broad. The apical margin of the last dorsal segment has a row of bristles extending over the median process.

Head and thorax pale yellowish, without dark marks. The basal joint of antennae also pale, but beyond largely black; toward tip the joints are banded. The wings have the yellowish tint of *B. smithi* and *B. cava.* The fore pair are marked much as in *B. selina,* but not as heavily, the narrow bands rather further apart, and the two large costal spots toward tip are smaller than usual in *selina,* no other large marks; the subcosta near the large spots is curved about as *selina.* In the hind wing the stigmal spot is prominent and beyond are some faint irrorations, much as in *selina*; more irrorate than in *smithi.* Length of forewings 12 mm. One male from Cohasset, Mass. 20 June, 1908, Type M.C.Z. no 28,557.

Betten and Mosely in the Walker Trichoptera, 1940, have a *Neuronia childreni* (page 90) based on a female without locality. They mention dark marks on vertex and on mesonotum, while the pronotum is very pale and with pale bristles; the new specimens of *B. cava* agree closely with this coloration. Their figure of the wing is broader than any of the *B. cava* I have seen, but the figure of the female genitalia is like *B. cava.* Unless another species is found with the same markings I think *B. childreni* must be *B. cava.*

For my *Neuronia canadensis* which has the radius not only curved near stigma, but often united to the subcosta for at least a point, I propose a new genus **Alleodes** (*Alleodes canadensis*). The male genitalia occupy only the lower half of the tip of the abdomen, and are very different in structure from *Banksiola.* In *Banksiola* the head is broader than in

Alleodes, and each hind ocellus about its diameter from the eye; in *Alleodes* the head not so broad, and the hind ocelli closer to the eyes and look more laterally. The apical area of the wing is proportionally longer in *Alleodes* than in *Banksiola,* and some apical veins almost parallel to its fellow.

Neuronia angustipennis Hagen

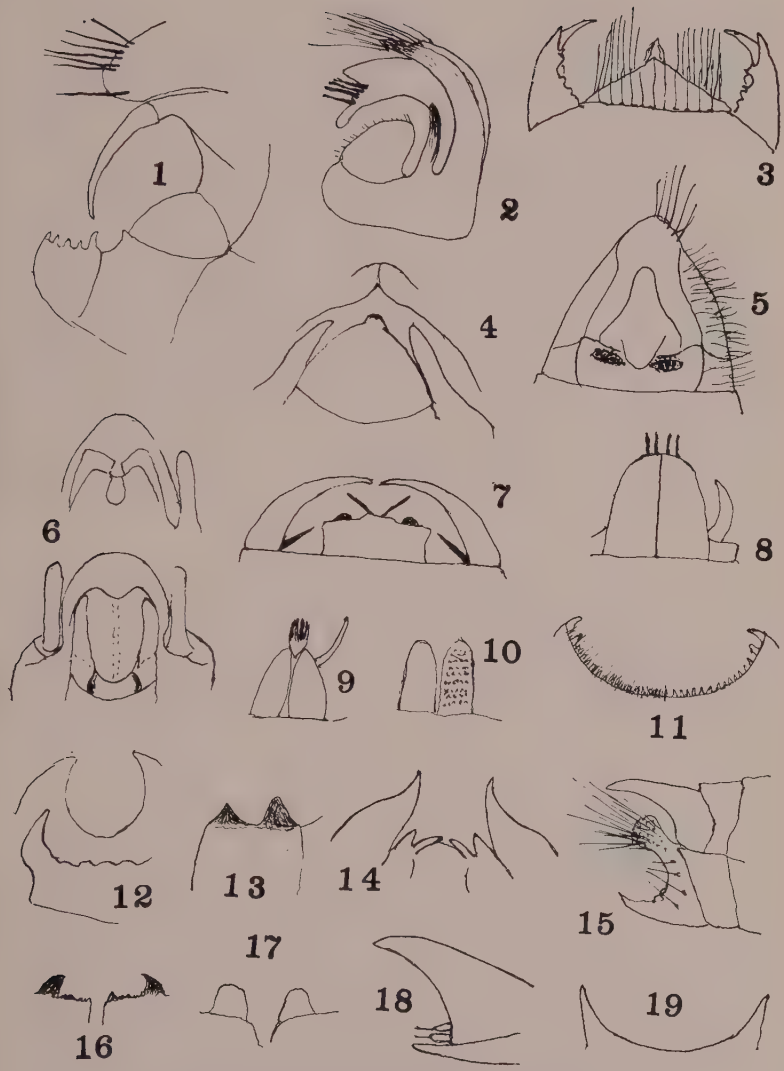
Figures 1, 9, 11

This species is well separated from the usual *Neuronia* by a much more narrow wing and the details of the male genitalia; the costal margin of forewing only very slightly concave. The ocelli are proportionally much further apart than in the other species of *Neuronia.*

I make the new subgenus, **Neuronella,** for *Neuronia angustipennis* (*Neuronella angustipennis.*)

Explanation of Plate 2

Fig. 1. *Neuronia angustipennis,* side, genitalia. Fig. 2. *Banksiola dossuaria,* genitalia, side. Fig. 3. *Banksiola cornuta,* tip of abdomen, above. Fig. 4. *Banksiola cornuta,* female, below. Fig. 5. *Neuronia angustipennis,* female below. Fig. 6. *Banksiola cava,* female, below, of two specimens. Fig. 7. *Banksiola cava,* male, tip, above. Fig. 8. *Banksiola dossuaria,* male, tip, above. Fig. 9. *Neuronia angustipennis,* male, tip, above. Fig. 10. *Banksiola dossuaria,* male, dentate processes. Fig. 11. *Neuronia angustipennis,* margin of last ventral segment. Fig. 12. *Banksiola cornuta,* from behind. Fig. 13. *Banksiola selina,* processes on hind margin, Clare Co. Mich. Fig. 14. *Alleodes canadensis,* male above. Fig. 15. *Banksiola cornuta,* side. Fig. 16. *Banksiola selina,* processes, Tim Pond, Me. Fig. 17. *Banksiola selina,* processes, Petersham. Fig. 18. *Alleodes canadensis,* side of male. Fig. 19. *Banksiola cornuta,* hind margin from below.



BANKS — NEW ENGLAND PHRYGANEIDAE

NOTES ON ALASKAN COLLEMBOLA I. A NEW GENUS AND SPECIES OF THE FAMILY ISOTOMIDAE[1]

By Kenneth A. Christiansen
Biological Laboratories, Harvard University

This is the first in a series of papers on the Collembola fauna of northern Alaska. The material on which this paper is based was collected by Dr. Neal A. Weber while holding a contract with the Office of Naval Research and while stationed in the Alaskan Arctic under the support of the Arctic Research Laboratory.

I wish to thank Dr. Marie Hammer and Dr. Harlow B. Mills for their helpful suggestions concerning this work.

Weberacantha, n. gen.

Anurophorini, facies superficially proisotomid. Body somewhat elongate. Head prognathous, slightly narrower than second thoracic segment; antennae four-jointed, fourth joint about twice as long as third and slightly swollen, without retractile apical bulb, and with well-developed blunt olfactory setae; eyes eight on each side on a pigmented field; P.A.O. elongate, elliptical, with flap-like margins.

First thoracic segment reduced, not imbricate. All other body segments clearly imbricate. No marked ankylosis of of abdominal segments. Sometimes division between fifth and sixth segments obscure; all other intersegmental membranes clearly visible. Fourth abdominal segment distinctly longer than third, and longer than fifth and sixth taken together. Sixth abdominal segment downwardly skewed from fifth, and almost completely hidden by the latter when viewed from above. Fifth abdominal segment dorsally with a number of short stout spines. Anus ventrally directed. Furcula

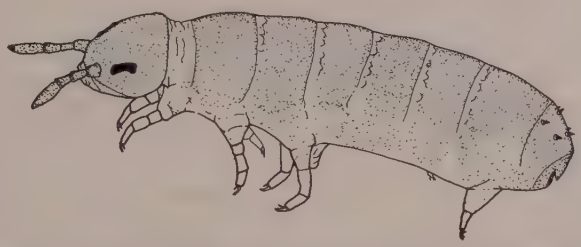
[1] Published with a grant from the Museum of Comparative Zoology at Harvard College.

with mucro, dens, and manubrium all distinct. Manubrium ventrally with a few large setae, dorsally with many short setae; dens dorsally with a few broad humps, and a few scattered setae; mucro with several teeth. Dens about twice as long as mucro. Rami of tenaculum quadridentate, corpus with a single stout seta. Legs stout; tibiotarsus possessing minute distal subsegment; claw simple, all feet with well-developed empodial appendage. Externally at the base of each leg a single large, straight seta; on legs two and three there are in addition two slightly smaller curved setae.

Integument finely reticulate, that is, possessing a network of thin, flat ridges, with the intervening areas slightly depressed. Head, antennae, and imbricate areas of the abdomen and thorax well pigmented, with scattered pale spots. Intersegmental membranes, legs, and furcula unpigmented. Clothing of smooth, short, slightly curved and appressed setae; a few longer, upright setae on the sides and posterior regions of the body. Bothriotrichia absent.

Weberacantha octa, n. sp.

Holotype. Pigment blue with scattered white spots, larger and more numerous on the head and anterior borders of segments than elsewhere. Intersegmental membranes, legs, and dentes white. First thoracic segment white, with



Text-figure 1: *Weberacantha octa,* habitus, holotype (setae omitted).

scattered pigmented areas. Antennae slightly paler than body; anal spines and mucro yellow. Reticulations on the imbricate areas of the thorax and abdomen more or less uniform, those on the head region being slightly larger and more irregular in shape; reticulations of intersegmental

membranes, first thoracic segment, and body appendages distinctly smaller, in many cases so small as to be indistinguishable from granulation. Fourth antennal segment with roundly conical apical projection; a distinct subapical pit with a small spherical papilla on a short stalk; numerous blunt sensory hairs of varying lengths starting just below the level of the subapical pit and continuing about three-fourths of the length of the segment. These hairs are of two lengths, the larger being about twice as large and somewhat thicker than the smaller ones. The distal and proximal hairs are all of the smaller type. Between these limits both types occur, rather irregularly scattered among numerous pointed hairs, the larger, blunt hairs being more numerous than the smaller. Sense organ of third antennal segment consists of two short, slightly swollen, erect rods set in shallow connecting pits, and with two longer, blunt guard hairs, one directly internal of the rods, the other positioned somewhat below and to outer side of the rods. Remainder of clothing of third antennal segment consists of four irregular transverse rows of more or less curved, pointed setae about twice the length of the guard hairs. Second antennal segment, three such rows, plus a single pair of very small pointed setae dorsal on the base of the segment. First antennal segment with one row of normal setae and ventrally about midway in the segment two short blunted setae set in shallow depressions. The outer of these is somewhat less than half the length of the normal pointed setae, and about twice as large as the inner blunt seta of that segment. Eyes eight on each side, on an elongated pigment spot which is somewhat attenuated in the middle. The two inner posterior eyes smaller than the rest. P.A.O. with flap-like margin especially marked on anterior edge, which is indented at about the middle.

Clothing of many short stout setae, smooth and mostly curved, so as to be pointing posteriorly. Setae on head mostly uniformly short, curved rearward. Head with a set of four slightly longer setae directly along the posterior margin of the P.A.O., curved forward so as to overhang the P.A.O.; a few scattered short, straight setae also present, mostly along the posterior and lateral margins of the head.

Longer straight erect setae (two to three times as long as the normal setae) positioned as follows: second thoracic segment with a pair, one near each anterior lateral corner of the imbricate area; third thoracic segment with a similar pair, more posterior in position; abdominal segments 1 and 2 with a median lateral pair of somewhat shorter setae; abdominal segment 3 with a median transverse row of four setae, with the more lateral setae being longer; abdominal segment four with an anterior and a posterior row of four setae each, with the more lateral setae again being the longer, anterior row of long setae about one-third of the way back from anterior border of the segment and the second row of somewhat shorter setae just before the posterior border of the tergite; on the fifth segment a single median transverse row of setae; and sixth segment with four long setae and numerous short straight ones. Fifth abdominal segment dorsally with eight small spines on short papillae, arranged in two transverse rows of four each.

A very small internal tooth is visible about midway up on the first pair of claws. No other teeth present. Empodial appendage stout, acuminate, with a broadly rounded inner lamella, and a well-developed apical filament.

Manubrium with two ventral setae near the bases of the dentes and dorsally with twenty straight smooth setae arranged in two irregular double rows, confluent basally, then running down the outer sides of the manubrium so as to leave a distal, central, triangular, naked area. Dens dorsally with a single low, broad hump and five setae, positioned as follows: one at base of the dens, three forming a centrally positioned triangle, and a fifth short curved setae ventrally just before the mucro. Dens abruptly narrowed at the end and distinctly wider than the mucro. Mucro distinctly separated from dens, tridentate, slightly curved and somewhat larger basally. Basal tooth distant from the apical and subapical teeth. Subapical tooth pointed upward and distinctly larger than the apical and basal teeth which are subequal. Apical tooth pointed forward and only slightly curved. Genital plate of male simple, not clearly demarcated, and

lacking setae. Two large setae are present near each lateral edge, and a pair of small setae near the anterior border.

Variation

The P.A.O. of some specimens shows no indentation in the anterior margin, while others have both anterior and posterior margins indented. The flap-like nature of the anterior margin can be seen in all specimens, although sometimes only with difficulty.

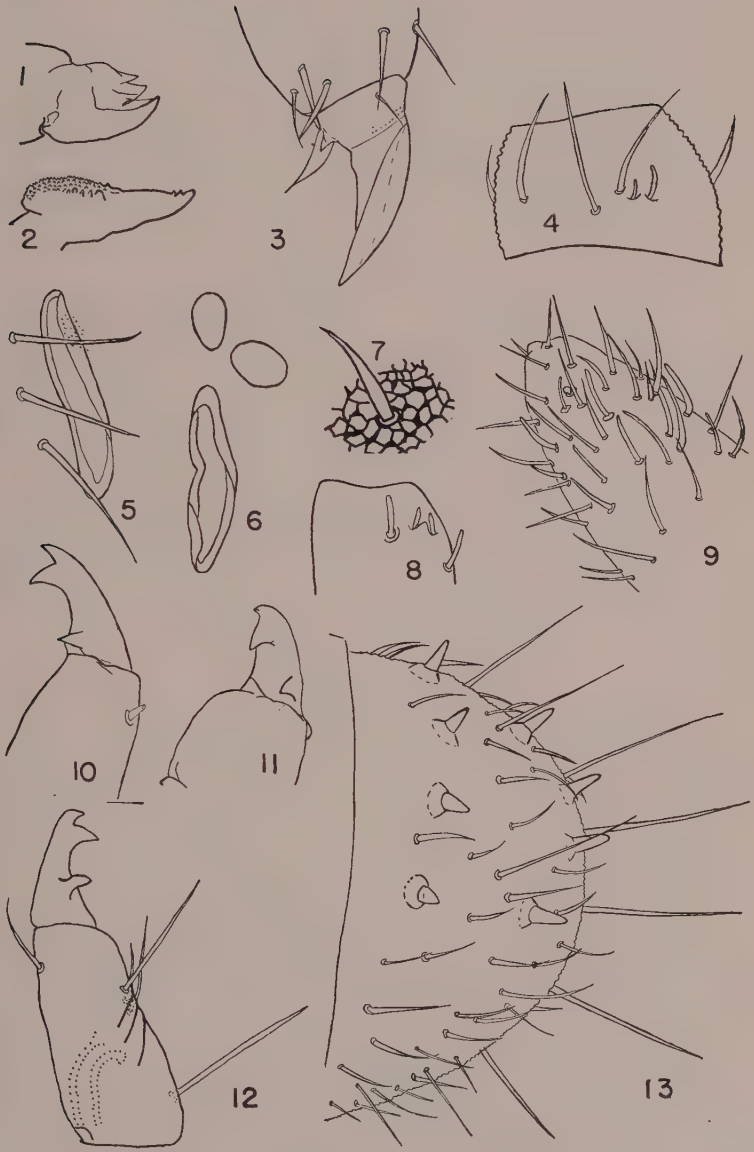
In some specimens the pigmented patch bearing the eyes is so constricted in its central portion as to give the effect of two separate patches.

In a few cases the second antennal segment has more than a single small seta at its base, as many as three having been observed.

The straight setae on the body vary somewhat. There is often present a single transverse row of short erect and straight setae on the second and third thoracic and on the first abdominal segment. These rows vary in their position, and one or more of them may be lacking. The long straight setae vary somewhat in number, some specimens having none on the first abdominal segment and only one pair on the third abdominal segment. The median pairs on the third and fourth abdominal segments may not be erect and are often only slightly longer than the common setae.

Explanation of Plate 3.

Weberacantha octa. Magnifications are approximate. Fig. 1. Right maxilla of paratype seen from above (900 X). Fig. 2. Right mandible of paratype seen from above (900 X). Fig. 3. Right hind claw of holotype (800 X). Fig. 4. First antennal segment of holotype, ventral view (800 X). Fig. 5. Left postantennal organ of holotype seen from above (800 X). Fig. 6. Left postantennal organ and anterior ocelli of paratype seen from above (800 X). Fig. 7. Single cephalic seta of paratype, showing the surrounding integumentary reticulations (900 X). Fig. 8. Sense organ of the right, third antennal segment of holotype seen from above (800 X). Fig. 9. Apical region of the fourth antennal segment of paratype seen from above (800 X). Fig. 10. Left mucro of holotype, external view (800 X). Fig. 11. Left mucro of paratype seen from above and slightly to one side (800 X). Fig. 12. Left dens and mucro of paratype, external view (800 X). Fig. 13. Posterior portion of abdomen of paratype seen from above and slightly to one side (350 X).



CHRISTIANSEN—ALASKAN COLLEMBOLA

The low, broad humps on the dorsum of the dentes may be as many as three in number or they may be absent, and the short ventral seta is often reduced, or (rarely) absent.

The apical tooth of the mucro and the apical filaments of the empodial appendages are often broken off so as to give a truncate appearance to these structures. The very small internal tooth on the first pair of claws may be absent in some specimens.

Relationships

The general appearance and structure of the furcula of this species gives it a superficial resemblance to the *brevidens* group (Stach, 1947) of the genus *Proisotoma*; however, the reticulate integument, ventrally directed anus show that it is in reality allied to the tribe Anurophorini. Of the genera in this group it would appear to be most closely related to *Isotomodes* (Axelson, 1907), *Cryptpygos* (Willem, 1902), and *Subisotoma* (Stach, 1947). The body form and segmental ratios appear to be closest to *Subisotoma,* but the reticulate integument and presence of anal spines serve to separate it from all three genera.

Measurements

The pattern for measuring used in this paper requires some explanation. The only absolute measurements given are those of the holotype. All other measurements are given in the form of ratios. These ratios are taken for each tagmatal group as a comparison of all parts involved to one part, which is considered as a standard number, i.e., 10. Then the average deviation of each of the non-standard ratio numbers is calculated. It is hoped that this will make for easier comparison, as well as give some idea of the variation involved. In all cases, the ratios were taken from those specimens within the given size range, and, because of the heterogonic growth of these animals, can only be applied to specimens of similar size. All individual segmental measurements are those only of the imbricate or setaceous area, eliminating the highly variable intersegmental membranes. The total size measurements, however, included these parts.

Holotype measurement (in mm.). Total length (excl.

antennae) — 1.26, cephalic diagonal — .26, thoracic segment 2 — .17, seg. 3 — .15, abdominal seg. 1 — .12, seg. 2 — .12, abdmn. seg. 3—.12, abdmn. seg. .4—.17, abdmn. seg. 5—10, abdmn. seg. 6—.05, antennal segment 1—.03, ant. seg. 2 — .04, ant. seg. 3 — .04, ant. seg. 4 — .08, unguis 1 — .026, empodial appendage 1 — .012, unguis 3 — .031, emp. app. 3 — .015, manubrium — .08, dens — .04, mucro — .026.

Segmental ratios for size range 1.18 — 1.30 mm.:

(standard, thoracic segment 2=10)

	cephalic diagonal	thoracic segment 2	thoracic segment 3	abdominal segment 1	abdominal segment 2	abdominal segment 3	abdominal segment 4	abdominal segment 5	abdominal segment 6
mean ratio	14.9	10	3.8	6.4	6.7	7.1	9.6	5.3	2.2
average deviation	.5	X	.4	.3	.3	.3	.4	.3	.4

(standard, antennal segment 4=10)

	antennal segment 1	antennal segment 2	antennal segment 3	antennal segment 4
mean ratio	3.5	5.7	5.5	10
average deviation	.2	.2	.2	X

(standard, unguis 3=10)

	unguis 1	unguis 3	empodial appendage 1	empodial appendage 3
mean ratio	9.1	10	4.2	4.5
average deviation	.7	X	.4	.3

(standard, manubrium=10)

	manubrium	dens	mucro
mean ratio	10	4.9	3.0
average deviation	X	.3	.3

Type locality: 68°, 20′ N., 151°, 30′ W., Anaktuvuk, Alaska, July 7, 1949. The holotype (mounted on a slide in Salmon's mixture) and seven paratypes are being deposited in the United States National Museum, Washington, D.C. Five paratypes are being deposited in the Museum of Comparative Zoology, Cambridge, Mass.

This species has also been taken by Dr. Marie Hammer from Mount Richardson, just west of the Mackenzie Delta in Arctic Canada.

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THE STRUCTURE AND RELATIONSHIPS OF *OLIARCES* (NEUROPTERA)[1]

By Frank M. Carpenter
Harvard University

Somewhat more than forty years ago, Dr. John B. Smith, while traveling in California, collected a conspicuous neuropterous insect, which was subsequently described by Banks (1908) as *Oliarces clara*. Efforts to find additional individuals were unsuccessful for many years, but a second specimen has at last been secured. Mr. P. A. Adams, of the University of California, who received the insect from the collector and who has already published a note on its discovery (1950), kindly loaned me the new specimen for further study and for comparison with the type. I am indebted to him for this courtesy and for the opportunity of clarifying, to some extent, the systematic position of this remarkable insect.

The type locality, "Walters Sta., Calif.", has been the subject of much speculation and its location not generally known. According to Mr. Banks (personal communication) Smith collected the specimen while the train on which he was traveling was stopped at Walters Station for water. Current maps do not include this place, but the 1901 edition of the Century Atlas shows a "Walters" on the Southern Pacific Railroad, about ten miles northwest of the Salton Sea bed; and the engineering department of the Southern Pacific Company informs me that this was a station around 1900. It is also listed in Gannett's "Dictionary of Altitudes" (1906), which further states that the "point on base under water tank" is 191 feet below sea level. There is no doubt in my mind, therefore, that this Walters is the type locality of *clara*. The new specimen was collected near Parker Dam, San Bernardino County, about 70 miles from Walters and in the same kind of environment.

[1] Published with the aid of a grant from the Museum of Comparative Zoology at Harvard College.

The following account of the structure of *Oliarces clara* is based on the holotype (male) and the new specimen (female), which is here designated the allotype:

Frons and vertex dark brown to black; clypeus, mouthparts and antennae light reddish brown; pronotum and mesonotum dark brown to black; metanotum dark reddish brown, lighter near wing bases; legs yellow-gray to medium brown; abdominal tergites medium brown, membranous areas yellow-brown; last two abdominal segments dark reddish brown above; abdomen yellow from beneath. Wings hyaline, the bases tinted with reddish brown. Antennae (broken away at second segment in holotype) with 40 subequal segments. Body in general covered with long brown or black hairs. Fore wing of holotype 16 mm. long and 5 mm. wide (maximum); that of allotype 20 mm. long and 7 mm. wide. Both pairs of wings are of similar texture, being colorless and hyaline. Each wing bears two distinct nygmata. The wing venation of the allotype is shown in text-figure 2; that of the holotype has already been figured by Banks (1908). As Adams has pointed out, the venational differences in the wings of the two specimens are well within the limits of variation occurring in other Neuroptera. A discussion of the generic features of the venation is included below.

The terminal abdominal segments of the male, briefly described by Banks, are illustrated here (Plate 4, fig. 2) in detail because of their significance in determining generic relationships. The ninth tergite is much longer laterally than dorsally, being reduced to a narrow strip in the middorsal region. The ninth sternite has migrated posteriorly so that it is ventral to the tenth tergite; it is long laterally but constricted medially. The tenth tergite is conspicuously extended to form the anal plates, which are directed more dorsally than ventrally and which appear from above like hairy knobs. A posterior-dorsal view of the abdomen clearly shows the anus, as well as a pair of sclerotized structures which are apparently the modified tenth sternite.

The terminal segments of the female abdomen are shown in figure 3B, drawn from Mr. Adams' specimen. Although

these were not removed and softened, as was done with the holotype, the sclerites are clearly defined. The eighth tergite extends further ventrally than the preceding tergites, and the ninth extends to the ventral surface. The eighth sternite is not visible externally, but is presumably reduced to sclerotized rods or plates encompassed by the ninth tergite. The tenth tergite is small and tapering, with conspicuous trichobothria near the margin of the ninth tergite. The ninth sternite is represented by a pair of very small plates, more or less fused, each bearing a minute papilla distally. These two plates are apparently the homologues of the psammarotrum or sand-plow of the Australian ithonids.

Holotype (♂): Walters Station, California; April (J. B. Smith); in M.C.Z.

Allotype (by present designation): 3 mi. southwest of Parker Dam, San Bernardino Co., April 25, 1949 (C. M. MacNeill), taken at light; in collection of P. A. Adams.

Since only one species of *Oliarces* is known, any diagnosis of the genus is probably tentative. However, considering the characteristics involved in the classification of other Neuroptera, I propose the following: the hyaline nature of both pairs of wings; in the fore wing the presence of a recurrent costal vein, of about five (probably variable) branches of Rs, and of relatively few cross-veins in the wing as a whole, as well as the absence of connecting cross-veins between costal veinlets; in the hind wing the transverse position of the basal part of MA (see below); in the male abdomen, the dorsally directed anal plates; and in the female, the absence of a distinct psammarotrum. The presence of two nygmata in the hind wing is of doubtful generic value, although only one is present in the specimens which I have seen of *Ithone, Heterithone* and *Varnia*.

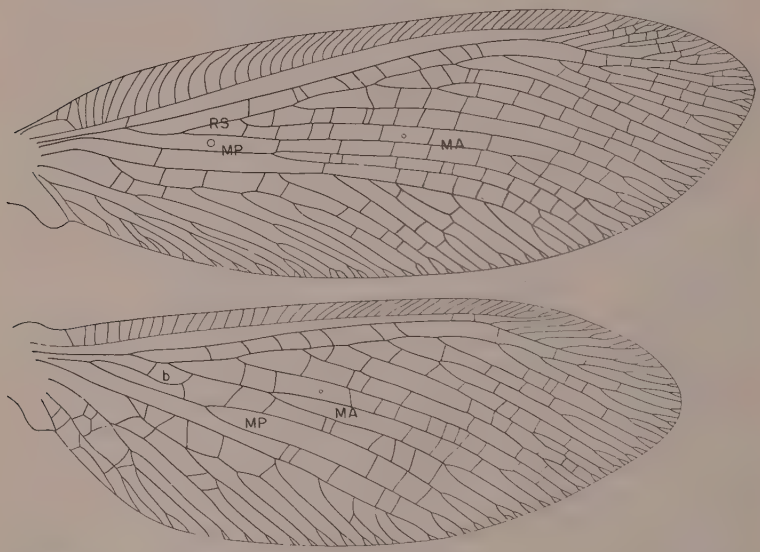
The relationships of *Oliarces* with other Neuroptera have been very uncertain. Although originally placed by Banks (1908, 1913) in the family Hemerobiidae, as broadly conceived, it does not fit into the current and more restricted definition of that family. Tillyard, who noted this in 1916, suggested that a new family might be needed for it, but did not formally establish one. On the other hand, Brues and

Melander (1932) listed the genus under the family Ithonidae, otherwise known only from Australia; and Lameere (1936) has placed it in the Polystoechotidae. Since the uncertainty of the systematic position of *Oliarces* has been due in part to our very limited knowledge of the species on which it was based, the discovery of the female has given us additional information useful in comparisons.

It is at once clear, of course, that several superfamilies (Tillyard, 1925) of the Neuroptera——specifically the Coniopterygoidea, Nemopteroidea and Myrmeleontoidea — are so far removed structurally from *Oliarces* as to be eliminated from further consideration. The superfamily Hemerobioidea is not so readily disposed of, but many of the included families (i.e., Dilaridae and Mantispidae) can have only the remotest affinities with *Oliarces*. The Osmylidae, although superficially resembling *Oliarces* more than most hemerobioids, have a radically different abdominal structure, as can be seen by comparing Killington's figures of *Osmylus* (1936, p. 56 and 58) with those of *Oliarces* in the present paper. The Polystoechotidae, to which Lameere assigned *Oliarces*, and which were reviewed in my 1940 revision, have wings with definite gradate veins, absent in *Oliarces*; and the terminal abdominal segments (Carpenter, 1940, figs. 70 and 72) of both sexes bear no resemblance to those of *Oliarces*, there being no anal plates in the male and no indication of a psammarotrum in the female. The Hemerobiidae, being a much larger and diversified family than the Osmylidae and Polystoechotidae, exhibit a greater range of structural differences (Killington, 1936-37; Carpenter, 1940). In all, however, there are gradate veins and a venational pattern basically unlike that of *Oliarces*. The terminal abdominal segments of the males of some genera are surprisingly suggestive of those of *Oliarces*, but this is not true of the females.

I have passed over these hemerobioid families very briefly because I believe that anyone who examines the specimens of *Oliarces* or studies the figures included here will not seriously consider assigning the genus to any of them. The family Ithonidae, however, deserves much more detailed

consideration. As now known, it consists of three Australian genera: *Ithone* (New South Wales) with one species; *Heterithone* (eastern Australia) with three species; and *Varnia* (central and Western Australia) with a single species.[2] *Ithone* is the only one of these that has been collected in large numbers, the others being known by very few individuals. Specimens of all of these genera are contained in the Museum of Comparative Zoology, and have been studied for the present paper. Since no detailed drawings have been published showing the arrangement of the terminal ab-

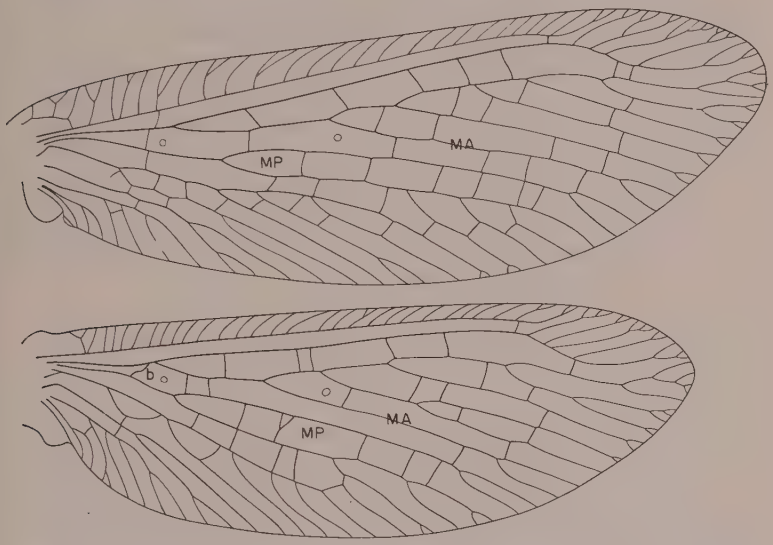


Text-fig. 1. *Ithone fusca* Newman. Fore and hind wings of male specimen in M. C. Z. (Woy Woy, N. S. W., Nov. 4, 1918, R. J. T.). Rs, radial sector; MA, anterior media; MP, posterior media; b, basal piece of MA between MP and Rs.

dominal sclerites in the Ithonidae, I include here a series of such drawings of *Ithone fusca*, and, to facilitate comparison with *Oliarces*, a drawing of the wings of the same species.

[2] The monotypic genus *Rapisma*, from the Malay Peninsula, has been doubtfully referred to the Ithonidae by some workers, but was excluded from there by Tillyard (1916). It will be treated in another article.

In comparing the venation of these genera with that of *Oliarces*, I have found it helpful to use the interpretation of neuropterous venation that was originally proposed by Martynov and that I employed in my revision of the Nearctic Hemerobioidea (1940, pp. 193-194). According to this concept, the most anterior branch of the media (labeled MA) is anastomosed in part with the radial sector or its last branch. In the fore wing, the actual separation of MA from

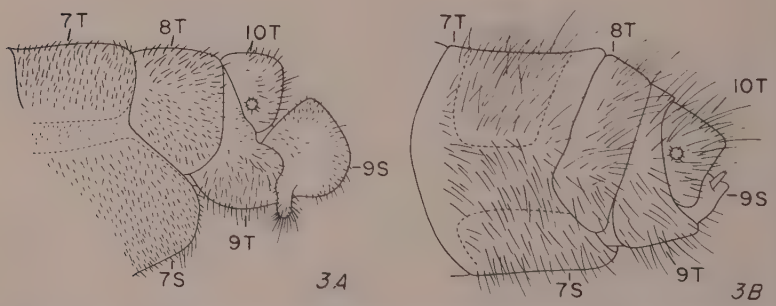


Text-fig. 2. *Oliarces clara* Banks. Fore and hind wings of allotype. Lettering as in text-figure 1.

MP is not apparent, but in the hind wing the basal piece of MA may extend a considerable distance before coalescing with the radial sector. Such is the case in *Ithone* (text-figure 1), *Heterithone* and *Varnia*. In *Oliarces* this segment of MA is very short and transverse, though it retains the sigmoidal form present in the Australian ithonids. This difference should not be regarded as more than of generic significance, however, since the several genera of Hemerobiidae exhibit a comparable diversity in the length of this segment. The same may also be said of the density of the

venation, for although there are fully twice as many terminal branches in the ithonids as in *Oliarces*, such diversity likewise occurs within the Hemerobiidae.

The general body structure of *Oliarces*, including the small, retracted head, and the large abdomen, strongly resembles that of the ithonids. The terminal abdominal segments, however, present some interesting differences. In the male of *Ithone*, as well as of *Heterithone* and *Varnia*, the ninth abdominal tergite is entire dorsally, even though much constricted (Plate 4, fig. 1A). The ninth sternite (hypandrium of Tillyard's terminology) of these genera, as in nearly all Planipennia, is extended further posteriorly than the tergite, but it is not nearly so modified here as in most Neuroptera. The tenth tergite, which includes the trichobothria, bears a pair of conspicuous anal plates, extending posteriorly and slightly curved inwardly. The tenth sternite is apparently reduced to internal plates, as in nearly all other Neuroptera. The homologues of the sclerites are



Text-fig. 3. A, Terminal abdominal segments of female of *Ithone fusca* Newman. Drawn from specimen in M. C. Z. (Woy Woy, N. S. W., Nov. 3, 1918, R. J. T.). Lettering as in text-figure 1. B, Terminal abdominal segments of female of *Oliarces clara* Banks. Drawn from allotype. Lettering as in text-figure 1.

readily found in *Oliarces*. Its ninth tergite is more constricted medially than in *Ithone*, but it is still undivided. The ninth sternite has migrated further posteriorly, and is smaller than in *Ithone*, but is otherwise similar. The anal plates of the tenth tergite, though directed upwards instead

of posteriorly, could easily be modifications of those of *Ithone*.

The terminal abdominal segments of the female of *Ithone* are shown in text-figure 3A. Tillyard, in describing these (1919, p. 426), states that the eighth, ninth and tenth abdominal segments "are more or less fused together, forming the projecting end of the abdomen." In alcoholic specimens, however, the segments are perfectly distinct. The eighth tergite extends further ventrally than the seventh; and the ninth, as in nearly all Planipennia, reaches all the way to the ventral surface. The eighth sternite is not visible externally. The ninth sternite in all the ithonids is posterior to the ninth tergite and is enlarged to form the sand-plow or psammarotrum. Its two lateral plates are fused dorsally by membranes but are, of course, separated posteriorly in the region of the gonopore. The psammarotrum bears a pair of conspicuous processes, directed ventrally; these were thought by Tillyard to be used as tactile organs during oviposition. The tenth tergite is short, hood-shaped and bears the trichobothria. In *Oliarces* (Figure 3B) the ninth tergite is not so long ventrally as in *Ithone* and the ninth sternite is reduced to a pair of very small plates, scarcely extending beyond the tenth tergite. That these plates do comprise the ninth sternite is indicated by the presence of a pair of small distal papillae, which, although they project dorsally, are clearly homologues of the longer, ventral processes in *Ithone*. No true psammarotrum, comparable to that of *Ithone*, is formed, but the structure is there in reduced form. The tenth tergite of *Oliarces* is similar to that of *Ithone*, except for a slight difference in its shape.

From the evidence reviewed above, *Oliarces* appears to be closer to the Australian ithonids than to any other Neuroptera. This resemblance is, in fact, so close that only one modification need be made of Tillyard's definition of the family; this is the recognition that the psammarotrum may be very small or vestigial.[3] It is noteworthy in this con-

[3] Tillyard also stated in his definition of the Ithonidae that the fore wings were of tougher consistency than the hind, being somewhat leathery; but this is certainly not true of *Heterithone pallida*, which Tillyard himself described as having very transparent and colorless wings.

nection that the reduced psammarotrum in *Oliarces* and many of its other features (e.g., the short basal piece of MA in the hind wing) appear specialized as compared with the corresponding structures of the Australian ithonids. The inclusion of *Oliarces* in the Ithonidae certainly makes an unusual distributional pattern for the family, but the paucity of specimens of most species implies that the group might well have a much wider distribution than is now known. Of course, since the larvae of the Neuroptera provide the only completely satisfactory basis for their family classification, the systematic position of *Oliarces* will not be truly solved until its immature stages have been discovered.

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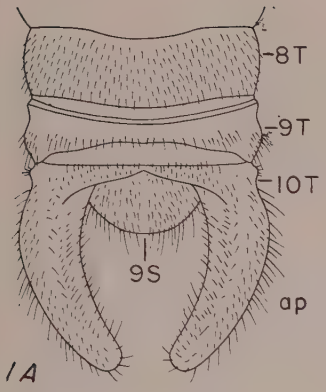
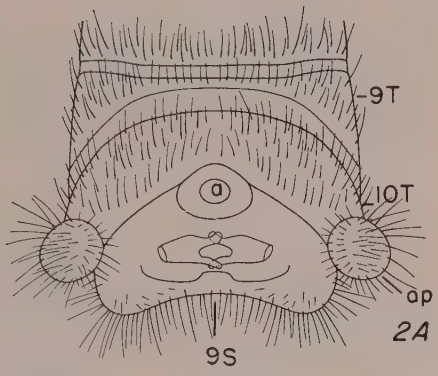
Explanation of Plate 4

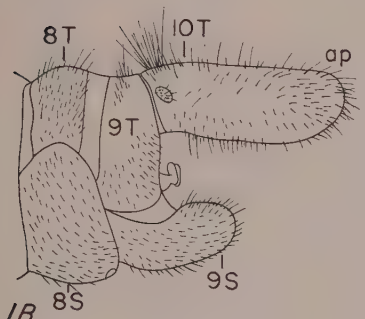
Fig. 1. Terminal abdominal segments of male of *Ithone fusca* Newman. Drawn from specimen in M. C. Z. (Woy Woy, N. S. W., Nov. 5, 1918, R. J. T.). 1A, dorsal view; 1B, lateral view; 1C, ventral view; ap. anal plate; 8T, 9T, 10T, abdominal tergites; 8S, 9S, abdominal sternites. Fig. 2. Terminal abdominal segments of male of *Oliarces clara* Banks. Drawn from holotype (M. C. Z.). a, anus. Other lettering as in figure 1.



1A



2A



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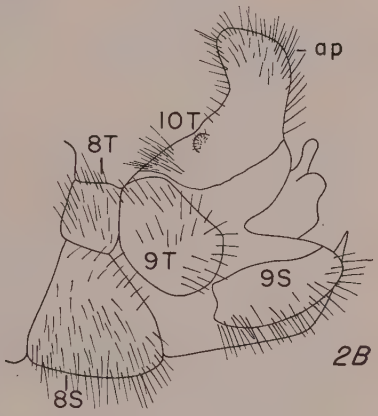

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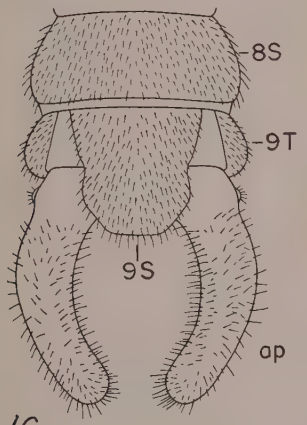

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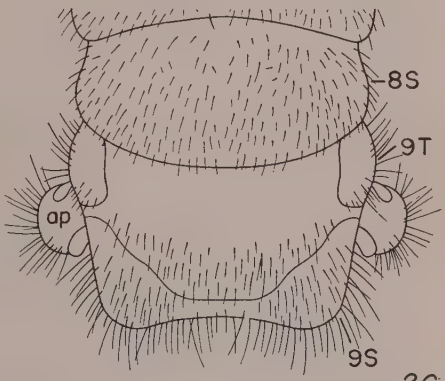

2C

CARPENTER — OLIARCES

DESCRIPTIONS OF SOME NEW CALLISTINAE (COLEOPTERA, CARABIDAE) FROM EAST AFRICA[1]

By P. Basilewsky
Belgian Congo Museum, Tervuren, Belgium

Through the kindness of Dr. P. J. Darlington, Jr. of the Museum of Comparative Zoology at Harvard College, Cambridge, Massachusetts, I have been able to study certain Carabidae collected by Mr. Arthur Loveridge during his trips in East Africa. I sincerely thank Dr. Darlington for this opportunity. In the material I have found three new forms belonging to the subfamily Callistinae. I here give their descriptions.

Pachydinodes raffrayi (Chaudoir) **darlingtoni** subsp. nov.

Length 15-17mm. Differs from the typical form, widely distributed in Tanganyika Territory and the southern part of Kenya Colony, as follows: Size larger; color lighter green, antennae and legs lighter ferrugineous; form more elongate and slender. Prothorax with sides very distinctly narrowed toward base, widest near middle of length; posterior angles more rounded; base nearly same width as anterior margin; punctation of upper side the same. Elytra more ovate, distinctly widened behind the shoulders; latter less prominent; greatest width of elytra near middle of length; striae strongly impressed, punctured (lightly) only in anterior half, intervals more convex, especially in basal part. Lower side similar, but meta-episterna longer and with several large punctures. The two specimens seen have no trace of a preapical yellow spot.

Portuguese East Africa: Lumbo (A. Loveridge, 1.IX. 1918, 2 ♀♀). Holotype in the Museum of Comparative Zoology (Type No. 28,233); paratype in the Musée du Congo Belge, Tervuren.

[1] Published with a grant from the Museum of Comparative Zoology at Harvard College.

The differences given above completely change the appearance of the beetle as compared with typical *raffrayi*. It is possible that the new form is in fact a distinct species; but, as I have seen only two females, I prefer to wait for more material before deciding the degree of relationship more precisely.

Epomis loveridgei n. sp.

Length 18.5; greatest width 7.2 mm. Upper side dark violaceous, very shining; scutellum black; lower side black, without metallic reflections; legs ferrugineous, femora very dark, nearly black; antennae brown.

Head wide and short; eyes large, moderately prominent, temples very short, almost enclosed by the anterior margin of prothorax; upper surface smooth at middle, with some large scattered punctures posteriorly and laterally; labrum small, with anterior margin straight; palpi elongate, last segment (♂) of maxillary ones straight at tip, last segment of labial ones faintly enlarged, next to last segment with several setae; maxillary ones pubescent; antennae with 4th segment pubescent, 3rd a little longer than 4th.

Prothorax large, faintly convex, slightly cordiform; anterior angles rounded; sides gently rounded in first two-thirds, then narrowed and sinuate; posterior angles right; base straight, not margined, nearly same width as anterior margin; greatest width slightly before middle; median line fine and short but well marked; lateral troughs narrow; inner basal foveae rather deep, fairly long, nearly linear; upper surface flat, with faint longitudinal median depression in which is the median line; surface covered with irregularly spaced large punctures; anterior lateral setae missing, the posterior ones in the lateral troughs distinctly before the angles.

Elytra sub-ovate, faintly convex, with greatest width near middle; basal margin angulate at shoulder; apical truncation oblique and rounded; shoulders faintly developed; striae strongly impressed, well punctured, nearly reaching base, the scutellar one long and straight; intervals strongly convex, very shining, without microsculpture, punctate only at sides against the striae; 8th interval covered with spaced

punctures, but 9th entirely punctured-shagreened; seven dorsal punctures on the 3rd interval.

Lower side shining, nearly glabrous; prosternal process not margined, hastate, with a tuft of setae at tip; pro-episterna with some large punctures anteriorly, near the internal suture; meso-episterna smooth; meta-episterna as wide as long, with numerous punctures; abdomen punctured-shagreened at sides; aedeagus as figured (Fig. 1).

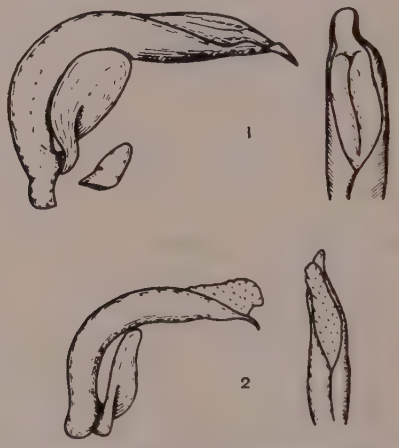

Figure 1. *Epomis loveridgei,* n. sp., aedeagus. Figure 2. *Chlaenius (Platychlaenius) uzungwensis,* n. sp., aedeagus.

Tanganyika Territory: Bagil, Uluguru Mountains (A. Loveridge, IX. 1926). Holotype ♂ in the Museum of Comparative Zoology (Type No. 28,234). The type is unique.

This new and remarkable species is allied to *Epomis violaceipennis* Chaud., of West Africa and the Belgian Congo, by the smooth and convex intervals punctate only against the striae, by the same convexity of body, by the prothorax little widened anteriorly, and by the absence of a yellow elytral margin. It differs from *violaceipennis* in color of head and prothorax, in elytra being more shining, and in other ways. The prothorax of the new species is more transverse, distinctly cordiform, with sides strongly sinuate posteriorly, and with stronger but more widely spaced punc-

tures. The elytra are more distinctly ovoid in shape, with shoulders more obliterated and interstices more convex, more shining, and without microsculpture. The lower side has less, but coarser, punctation; the prosternal process is less acute at tip; the meso-episterna are smooth; and the meta-episterna are shorter, not longer, than wide. Finally, the last segment of the labial palpi is less dilated than in any other form of the genus, that of the maxillary palpi being simple. The aedeagus is different too.

Chlaenius (Platychlaenius) uzungwensis n. sp.

Length 13 mm. Head and prothorax reddish brown, the latter a little lighter; elytra black, scutellum reddish; lower side of head and prosternum reddish brown, other sterna and abdomen black; legs and antennae dark ferrugineous.

Head long, with very fine punctation, chiefly on disk, nearly obliterated on vertex; eyes large and prominent, temples short, faintly narrowed posteriorly; anterior margin of labrum barely concave; antennae long, barely exceeding basal third of elytra, 3rd segment much longer than 4th.

Prothorax nearly as long as wide, faintly convex; anterior margin weakly emarginate; anterior angles prominent, broadly rounded at tips; sides gently rounded, not more narrowed posteriorly; greatest width a little before middle; posterior angles blunt, widely rounded at tips; base faintly concave, as wide as anterior margin, not emarginate; median line fine, superficial, reaching neither anterior margin nor base; marginal gutters strongly widened posteriorly where sides are broadly explanate and slightly elevated; basal foveae very broad; upper surface with roundish, rather large but not very deep punctures, very numerous at sides especially near posterior angles, more widely spaced on disk; each puncture with a long, yellowish white seta; anterior lateral setae missing, posterior ones before angles.

Elytra sub-ovate, weakly convex; greatest width behind middle; shoulders rounded; apical truncation oblique, indistinctly sinuate; striae fine but rather deep, not very distinctly punctured, the scutellar one long; intervals weakly

convex, with reticular microsculpture plain under strong magnification, and covered with rather large, rounded, not very deep punctures from which rise long setae, longer at the apical declivity than elsewhere.

Lower side with relatively reduced punctation and pubescence; prosternal process rounded at tip, weakly margined, punctured and pubescent; pro-episterna nearly smooth, with some rather faint punctures near anterior margin; meta-episterna slightly elongate, narrowed posteriorly, strongly punctate, without external groove; abdomen punctate and pubescent at sides, nearly smooth at middle.

Legs long; protibiae of male without tooth near base; upper side of tarsi glabrous; 5th tarsal segment with a double row of spines; aedeagus as figured (Fig. 2).

TANGANYIKA TERRITORY: Uzungwe Mountains, Dabaga (A. Loveridge, 4. XII. 1929). Holotype ♂ in the Museum of Comparative Zoology (Type No. 28,416). The type is unique.

This is a very distinct species, sharply set off by its coloration. I place it, provisionally at least, in subgenus *Platychlaenius* Jeannel, because of its nearly smooth pro-episterna, but it is strongly differentiated from the other forms of this group by characters given above. The sculpture of the elytral intervals is not granular as it is in most species of *Platychlaenius*.

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